What is the current control efficiency of the existing DSI system on Healy unit 1? The SIP documents imply that the current DSI system is achieving 50% control. From the draft SIP:

> "Although EU 1 has a less stringent emissions limit of 0.30 lb/MMBtu, the boiler is equipped with DSI using sodium bicarbonate, which the EPA Air Pollution Control Cost Manual estimates can achieve control efficiencies of 50 to 70%."

Also GVEA's January 2009 BART submittal states:

> "Under current operation, the dry sodium bicarbonate system **consistently achieves approximately 50 percent removal of SO2** (percent removals listed in the SO2 BART analysis section will be calculated from an uncontrolled emission levels unless specifically noted otherwise)."

However, we noted that given the low sulfur content of the Usibelli coal and the controlled emission rates, the 50% control efficiency estimate cited in the SIP seems much higher than expected. We estimated uncontrolled emission rates using two separate methods and it appears that current actual control efficiency may be much lower than 50%.

First, we estimated the uncontrolled emissions for 2016-2019 using a mass balance approach:

$$SO_2 = S_{fuel} \times F \times 2$$

Where:

- S_{fuel} = sulfur content of the fuel burned (fraction by weight) reported in the triennial point source emission inventories (2016-2019) for Healy unit 1 provided in Appendix III.K.13.F Part 2
- F = quantity of fuel burned (coal throughput), reported in the triennial point source emission inventories (2016-2019) for Healy unit 1 provided in Appendix III.K.13.F Part 2
- 2= pounds of sulfur dioxide per pound of sulfur (based on atomic weight ratio of SO_2:S which is 64:32 or 2)

Using this method, control efficiencies range from 15% in 2016 to 39% in 2019, with an average of 28% control 2016-2019. (See "GVEA_Reported_Operating_Data" tab in the attached spreadsheet). (Note, this method assumes 100% oxidation of fuel-bound sulfur. This may be an overestimate of uncontrolled emissions depending on the coal quality/classification—see method 2 below. As such, it may overestimate the calculated control efficiencies.)

Second, we used the SO_2 emission factor reported in AP-42 for lignite coals (see "Calc_uncontrolled emiss_AP-42" tab in attached spreadsheet). There may be some issues with using the AP-42 emission factor for Usibelli coal, as it resulted in

inconsistencies between the calculated uncontrolled emissions and the reported controlled emissions in 2016. (Note: the Usibelli mine classifies their coal as subbituminous, but the Energy Information Administration classifies it as lignite and/or waste coal based on the heat and water content.) Nonetheless, calculated control efficiencies using this method are even lower than those using the mass balance approach.

We would appreciate if ADEC would clarify (1) the uncontrolled SO_2 emission rate and (2) the actual control efficiency achieved with the existing DSI system on Healy unit 1.